CORRESPONDENCE.

Formaldehyde as an Aid in Collecting Ornithological Specimens.

To the Editors of 'The Auk':—

Dear Sirs:—At various times during my collecting experiences I have made experiments for the purpose of finding some preservative that would temporarily check decay in an ornithological specimen without having any injurious effect upon the skin of the bird or upon the hands of the operator while preparing the skin for his collection. Various compounds and combinations of arsenic, borax, carbolic acid, corrosive sublimate, etc., had been tried with but partial success and with more or less damage to the operator, the usual result having been some bad sores in any slight cuts or around the finger nails. Formic aldehyd gas (H C O H) had attracted my attention in the journals of the day in connection with its disinfecting and insecticidal properties, but I had not seen any commercial solution of it, and did not know where to find such an article.

In August, 1897, while collecting sea birds on Monterey Bay, California, specimens accumulated more rapidly than it was possible to handle them in that rather warm, damp climate, as had often happened on previous occasions. During this visit I became slightly acquainted with a student from Stanford University who was collecting Zoöphytes, etc., from the bay and discovered that he was using a weak aqueous solution of formic aldehyd to preserve his specimens, and also that this could be purchased under the proprietary name of 'Formalin' with a strength of 40 %.

After my return to San Francisco inquiry developed the fact that this solution could be procured at a much lower rate under the trade name of 'Formaldehyde,' which at present writing is sold at 55 cents per pound bottle,—larger quantities being proportionately less.

While examining this collection of Zoöphytes the idea occurred to me of trying the effect of some of this solution upon my birds, as business demanded my presence elsewhere in a day or two and I was anxious to save all the specimens on hand. As the formaldehyde seemed to preserve the starfish and other more delicate forms with only a comparatively slight shrinkage it was reasonable to presume that a small amount injected into the abdomen of a bird would temporarily arrest decomposition of the viscera, and that probably the gas evaporating from the solution would permeate the flesh to a sufficient extent to preserve the bird for two or three days at least.

My new acquaintance kindly supplied me with a little of his solution for experimental purposes. A small glass syringe was procured, a couple

of teaspoonfuls were injected into the viscera of the birds to be experimented upon and, as the stomachs were full of fish, about half a teaspoonful was sent down the gullet, the throat being then plugged with cotton. Also on the afternoon before leaving I pulled the skins off some *Puffinus creatopus* and *P. griseus* that were still left, put some cotton dampened with the solution inside the skins, after they were turned back into natural shape again, and rolled them up in newspaper to be carried in a valise. Two days afterward both the birds in the flesh and the treated skins were found to be in good condition. The former were skinned and put up three days after having been shot, while the latter were scraped and finished as time permitted, the last ones having been five days in this condition. These were kept in a tight box containing a layer of damp sand upon the bottom and except for a slight hardening of the tissues were in sufficiently good shape to make a very fair skin.

These results exceeded my expectations, and further experiments demonstrated the fact that the use of formaldehyde places the collector in a comparatively independent position in regard to the number of specimens he may collect in a day, as with its aid he can keep a number in good condition until time admits of preparing them for his collection.

I came across an old-fashioned veterinary hypodermic syringe at a low figure, and this, with a bottle of saturated solution of formaldehyde accompanies me on all my expeditions. This syringe holds one teaspoonful, and this is sufficient for a bird as large as a Partridge. The sharp needle is punched into the abdomen in one or more places, a few drops are sent down the throat of a bird to be saved, and if to be kept for some days a little is injected into the brain by opening the bill and forcing the needle upwards and backwards between the eyeballs.

In place of a regular hypodermic, a common glass syringe, or even an eye dropper, can be made to answer, especially if the end is heated and drawn out to a sharp point as in an egg-blower.

The amount injected and the strength of the solution must depend upon the size of the bird. Formaldehyde comes in saturated solution of nominally 40%, while from 4% to 10% is what may ordinarily be used. For birds up to the size of a Partridge, 4% is sufficiently strong, from this to the size of a Duck 8 or 10%, and for Geese and very large birds a comparatively smaller amount of the full strength seems more satisfactory than a larger amount of a weaker solution. It is well to avoid, as far as possible, having one's hands come in contact with the strong solution as this is apt to harden the skin of the fingers and cause cracks into which arsenic may be introduced. Upon the basis of the original solution being 40% it is a simple matter to approximate any desired strength by mixing in a separate bottle one part of the solution to so many parts of water roughly estimated.

The strength and amount necessary for different birds will soon be learned with a little practice. If too much or too great a strength is used upon small birds the body becomes more or less hardened and dry, mak-

ing it exceedingly difficult to skin the specimen. Care must also be taken to avoid using more than is absolutely necessary in the throat, as the thinness of the gullet allows the formaldehyde to act directly upon the skin of the neck, which is apt to become so stiff and dry as to cause it to tear in the effort to skin the bird over the head. A few drops only will suffice for the preservation of this part of the bird, except in the case of a large crop full of decomposing food. When properly treated with this solution, and properly cooled off in the first instance, birds will keep a week even in warm weather in sufficiently good condition to make a fair skin.

The saturated solution of formaldehyde is 40%, but it evaporates easily and is usually about 36%. As it is greatly adulterated, sometimes being nothing but pyroligneous or acetic acid mixed with impure methyl alcohol, and even when comparatively pure is much reduced in strength by unscrupulous dealers, it is much wiser to procure the article from an absolutely trustworthy source than to buy indiscriminately.

As a convenient insecticide and preventive of mildew formaldehyde fills a long felt want. When a burner for making the gas (formic aldehyd) is not within reach some of the solution can be poured into dishes and placed in the cases of specimens. It performs its work in a few hours. An occasional fumigation of a collection will prevent all danger from insects and also from mould in an ordinarily dry atmosphere. The gas evaporates like ammonia from the aqueous solution, penetrating every crevice and interstice, and destroys all insect life as well as fungoid growths. It is a wise plan to subject all specimens received in exchange or by purchase to a thorough disinfection, which is easily done in this manner.

Two and a half years' use of formaldehyde has so demonstrated its effectiveness and convenience in the preparation of specimens that all ornithological collectors should become acquainted with its properties. It will be found of the greatest assistance in the field and in the laboratory.

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NOTES AND NEWS.

PROF. ALPHONSE MILNE-EDWARDS, an Honorary Member of the American Ornithologists' Union, died in Paris April 21, 1900, at the age of sixty-four years. Prof. Milne-Edwards was of English descent; his grandfather, Bryan Edwards, M. P., was a West Indian planter, who settled at Bruges, France. His father was the well-known eminent zoölogist of Paris, who died in 1885. The son, Alphonse, was associated many years with his father in zoölogical work.